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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BAYARD, EMMANUEL

ART UNIT

PAPER NUMBER

2631

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/352,404

Applicant(s)

CUPO ET AL.

Examiner

Emmanuel Bayard

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 12-21 is/are rejected.
- 7) ☒ Claim(s) 9-11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Objections

1. Claims 10 and 11 are objected to because of the following informalities: in claim 10, line 3 replace "transmtter" with --transmitter--. Appropriate correction is required.
2. Claim 11 is objected to because of the following informalities: in line 3, delete "the" after to. Appropriate correction is required.
3. Claims 12-20 are objected to because of the following informalities: in claim 12, line 3, replace "baeband" with --baseband--. Appropriate correction is required.

Claims 13-20 are likewise objected because they depend on a base objected claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-8, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guemas

U.S. Patent No 6,314,113 B1 in view of McGibney U.S. Patent No 6,021,110.

As per claims 1, 12 and 21, Guemas discloses an OFDM receiver comprising: means for recovering and sampling rf signal into in-phase (I) and quadrature (Q) components of a baseband

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signal (see figs. 1, 5, 8 and 9 element 119 and col.5, lines 55-67); means for computing auto correlation (see figs. 5, 8 and 9 elements 202k, 208k, 321, 322 and col.2, lines 20-30, 48-50 col.5, lines 58-67 and col.6, lines 10-13 and col.8, lines 5-6) amplitude and phase values of the I and Q components at sample points; means for averaging (see figs. 5, 8 and 9 elements TH2k, TH8k, 330 and col.5, lines 65-67 and col.8, lines 10-13, lines 25-30) the auto correlation values of the I and Q components over L symbols; means for providing a sample number indicating an OFDM frame boundary (see figs. 1 and 4 element 113 and col.1, line 44 and col.4, lines 35-47) using the averaged I and Q auto correlation values.

However Guemas does not teach means for providing an offset value indicative of the phase difference between the receiver and a transmitter; means for correcting frequency and timing offset between the receiver and the transmitter in the sample number.

McGibney teaches means for providing an offset value indicative of the phase difference between the receiver and a transmitter and means for correcting frequency and timing offset between the receiver and the transmitter in the sample number (see col.3, lines 48-67 and col.4, lines 7-13 and col.5, lines 45-67 and col.7, lines 10, 57-60).

It would have been obvious to one of ordinary skill in the art to implement the teaching of McGibney into Guemas so that the terminal 40 would tie its transmitter clock directly to its receiver clock so its transmit at the same position within the slot as it receives as taught by McGibney (see col.7, lines 57-59).

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As per claims 2 and 13, the receiver of Guemas does teach estimating frame synchronization of the OFDM boundary (see col.6, lines 24-25).

As per claims 3, 15 and 16, McGibney inherently teaches means for phase locking the transmitter and the receiver. Furthermore implementing the phase locking of McGibney into Guemas would have been obvious to one skilled in the art so that the terminal 40 would tie its transmitter clock directly to its receiver clock so its transmit at the same position within the slot as it receives as taught by McGibney (see col.7, lines 57-59).

As per claim 4, McGibney inherently teaches means for estimating the transmitter and the receiver frame offset. Furthermore implementing the estimation means of McGibney into Guemas would have been obvious to one skilled in the art as to provide the system for accurately correcting frequency and timing errors in the signals.

As per claims 5 and 14, McGibney inherently teaches means responsive to the sample number and a negative angle of the auto correlation values for correcting for frequency synchronization, frame synchronization and transmitter/receiver frequency offset . Furthermore implementing the responsive means of McGibney into Guemas would have been obvious to one skilled in the art so that the terminal 40 would tie its transmitter clock directly to its receiver clock so its transmit at the same position within the slot as it receives as taught by McGibney (see col.7, lines 57-59).

As per claim 6, the receiver of Guemas does include means responsive to a sampling clock for generating I/Q signals (see figs 1, 5 col.3, line 62 and col.5, line 63).

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As per claims 7 and 17, the receiver of Guemas does include a means for storing (see fig.7 element 210) the sampled I/Q coupled to the auto correlation means (see col.3, lines 30-31) and a correction means (see col.8, line 16).

As per claims 8 and 18, the receiver of Guemas does include a means for storing (see fig.7 element 210) the sampled I/Q coupled to offset estimator (see fig.8 and col.6, lines 42-45, 65-67) and a frame synchronization estimator (see figs. 1, 8 and col.4, line 6 and col.6, lines 24-25).

As per claim 19, McGibney inherently teaches adjusting the phase angle of each sample in a storing means by an amount proportional to "n". Furthermore implementing the adjusting step of McGibney into Guemas would have been obvious to one skilled in the art so that the terminal 40 would tie its transmitter clock directly to its receiver clock so its transmit at the same position within the slot as it receives as taught by McGibney (see col.7, lines 57-59).

As per claim 20, Guemas does include averaging the auto-correlation values over frames in a storage device (see figs. 5, 8 and 9 elements TH2k, TH8k, 330 and col.5, lines 65-67 and col.8, lines 10-13, lines 25-30).

Allowable Subject Matter

6. Claims 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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7. The following is a statement of reasons for the indication of allowable subject matter: the present invention teaches a method for correcting timing and frequency offset in an OFDM receiver. The prior arts of Guemas U.S. Patent No 6,314,113 and McGibney U.S. Patent No 6,021,110 teach a similar method. However the above mentioned prior arts fail to anticipate or render obvious the following recited features: a phase locked loop having a means for processing the frame difference through a filter and means responsive to the filter for integrating and rounding off the frame difference to the nearest integer value and a counter means responsive to the integer value providing a sample number for a desired frame boundary as recited in claim 9.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Klank et al U.S. Patent No 6,226,337 B1 teaches a method for transmission of reference signals..

Ohkubo et al U.S. Patent No 6,151,369 teaches a digital broadcast receiver.

Miyashita et al U.S. Patent No 6,381,236 B1 teaches a bi-directional digital transmission.

Taura et al U.S. Patent No 6,148,045 teaches a digital broadcast receiver.

Nakamura et al U.S. Patent No 6,108,353 teaches a demodulating apparatus.

Carlin et al U.S. Patent No 5,764,706 teaches an AM compatible waveform frame timing recovery.

Tore U.S. Patent No 6,310,926 B1 teaches an adjustment of the sampling frequency carrier.

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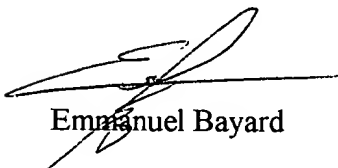
Junell et al U.S. Patent No 6,125,124 teaches a synchronization and sampling frequency in an apparatus receiving OFDM modulated transmissions.

Shirakata et al U.S. Patent No 6,169,751 B1 teaches an OFDM receiving apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham, can be reached on (703) 305-4378. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.



Emmanuel Bayard
Patent Examiner

January 7, 2003